



Active Continuous Optimization (ACO) for Server Infrastructure Performance Improvement



*Enterprise server infrastructure
optimization creates higher
performance within existing
infrastructure*

*Performance degradation occurred
in:*

77% of virtualization projects

*69% of data center consolidation
projects*

*43% of high-bandwidth Web 2.0
installations*

IT organizations face an unfolding crisis that limits their ability to deliver applications across the enterprise. Their top priorities – data center centralization, virtualization and collaboration – are cost-saving measures that negatively impact server performance and capacity, and saturate network bandwidth, creating an expanding drag on application performance. IT must find a way to resolve these issues before they can improve application performance across the enterprise.

Active Continuous Optimization attacks this problem head-on. ACO improves performance, and in some cases, generates order-of-magnitude increases in server performance. Additionally, virtualized and accelerated systems benefit as well. Veloxum's ACO solution is a rational alternative to adding servers, to upgrading bandwidth or to tolerating declining application performance.

Application Delivery Challenges

Application Challenges

According to a recent survey by CIO Magazine, virtualizing servers, centralizing data centers and adding high-bandwidth collaboration tools are IT's top priorities during this economic downturn¹. While these projects may make sense financially and tactically, they also have a negative effect on application operation. Consider these results from a recent survey²:

- 77% of corporations reported that virtualization had had a significant, negative impact on application performance.
- 69% of companies said data center consolidation was causing application degradation.
- 43% confirmed that high-bandwidth applications, such as video and collaboration, were making it difficult to maintain performance.

Operating System Settings: Lurking Inefficiency

A covert but significant performance obstacle exists within Enterprise server infrastructure: the native inefficiency and static nature of operating system settings.

For example, Microsoft Windows 2003 Server, Exchange 2003 and Windows XP – a common application set commonly deployed together – have over 350,000 permutations of configuration settings, not including the huge number of settings for browsers, or

Too many configuration permutations exist to manually optimize system performance

Active Continuous Optimization automates optimizing OS settings to unlock systems' potential and increase their efficiency and capacity

Veloxum identifies and fixes problems continuously - including virtualized systems - and does so without voiding support contracts.

Supported Operating Systems

- Microsoft Windows Server 2003, 2008
- Microsoft Windows XP, Vista
- Linux
- Sun Solaris
- Apple OSX
- IBM AIX
- VMware
- Hyper-V

Supported Applications & Databases

- Microsoft Exchange / Outlook
- Microsoft SharePoint
- Lotus Notes
- Citrix
- SQLserver
- Oracle

OS settings for CPU, I/O and RAM on servers, along with their associated desktop hardware.

Some of these settings may interact poorly with each other or even conflict. The majority are not well documented, especially in the significant way that they can cause synergistic effects with other settings. Although IT personnel can manually tune all hardware and software systems, in larger data centers, it is impossible to do so in a realistic timeframe. Virtualized systems magnify this issue as local changes become irrelevant with shifting workloads. As a result, IT personnel encounter performance degradation and reduced capacity within their server infrastructure across the enterprise. According to a study commissioned by the U.S. Department of Energy, headed by Dr. Jonathan Koomey, the average server delivers less than 20% of its performance capacity when deployed in a commercial enterprise.

The Solution: Active Continuous Optimization

Enterprise server infrastructure optimization tools that utilize active continuous optimization (ACO) attack overt and covert causes of degradation. They unlock the potential of the existing server infrastructure thus increasing the efficiency of what you already own, improving application performance across the enterprise without costly hardware upgrades or increases in bandwidth.

Veloxum's ACO approach

Veloxum created its own comprehensive Enterprise server optimization solution specifically to tune server performance and to maximize server capacity. It targets the heart of the server, the operating system, working to maximize the efficient use of all server and client components that depend upon OS interaction including:

- Applications and Databases
- CPU
- Memory
- Network
- Storage

Veloxum's features make it an exceptional tool by:

- Identifying and fixing performance problems via active remediation through a patent-pending process
- Rapidly optimizing both server and client, often within minutes
- Adjusting existing hardware and OS settings "out-of-band" while staying within the manufacturer's supported ranges
- Periodically optimizing with changes deployed either automatically or through existing change-control procedures
- Supporting Linux, AIX, SUN and Windows OS with supplied OS modules
- Optimizing popular apps such as Exchange, SharePoint, SQLserver, Lotus Notes and Oracle with optional Application Optimization Modules (AOM)
- And deploying quickly and easily

The Veloxum Architecture: Agents, Virtual Appliances, and a Management Console

Veloxum's Architecture

Three key components make up the Veloxum solution---Agents, Virtual Appliances, and the Management Console.

Agent

The Agent is a lightweight, cross-platform agent that identifies the components – applications, databases, hardware, software, and operating systems –installed on the target server or client. The Agent tests and reports the baseline configuration results to the Virtual Appliance. The Agent also implements required configuration changes when it receives instructions from the Appliance. To save resources, Agents remain dormant until they initiate active tests.

Virtual Appliance

The Virtual Appliance (VA) is a 64bit VMware image that controls Agents. When first deployed, the VA collects data from the Agents and automatically creates a baseline. It then compares the baseline against its business rules, identifies optimization opportunities, and creates settings change recommendations. The VA then transmits the configuration change instructions to the Agent. Deployment occurs immediately in automatic mode, or once authorized by IT in manual mode.

Management Console

The Management Console (MC) is a browser-based, control center that gives IT complete control over VA instances and provides continuous performance information back from them. Through the MC, IT personnel can set remediation to occur either immediately, on a deployment schedule or when manually set.

Veloxum can report through existing Enterprise monitoring tools

The MC maintains a history of all changes and can roll back any set of changes at any time. Existing enterprise monitoring tools, such as Microsoft's Operations Manager (MOM), can integrate and present MC data.

Installation and Operation

Installing Veloxum within the Enterprise is fast and easy. Installation follows generally accepted procedures and operation requires setting only a few options.

Installation

The Virtual Appliance (VA) Installs as a 1GB 64-bit image that downloads onto an existing VMware server. The Agent installs on all supported devices including local and remote servers, notebooks, and home office systems. It installs via standard software distribution methods and completes within in minutes. Once started, the Agent begins reporting metrics to the VA immediately.

Operation

Veloxum's system and method for optimizing operating systems, and application is a patent-pending process. (An overview of the technology can be found in Appendix A.) In addition to the previously mentioned base-lining, testing, reporting and implementing of fixes, Veloxum also validates implemented improvements, continuously monitors performance, and rolls back changes if desired. This feature combination – active remediation, validation, continuous

Active remediation, validation, continuous monitoring, and rollback – set Veloxum apart from other server and application monitoring-only tools

monitoring, and rollback – set Veloxum clearly apart from other server and application monitoring-only tools.

Performance Improvements

The following charts demonstrate typical performance improvements gained using Veloxum.

WAN/LAN Throughput

Figure 1 shows the improvements to WAN and LAN made possible by Veloxum's ACO process. WAN throughput (closer bars) increases from 37.13 Mbps (blue) to 443.99 Mbps (purple), a 1200% improvement.

LAN traffic increases from 46.86 Mbps (blue) to 167.39 Mbps (purple), a 350% increase.

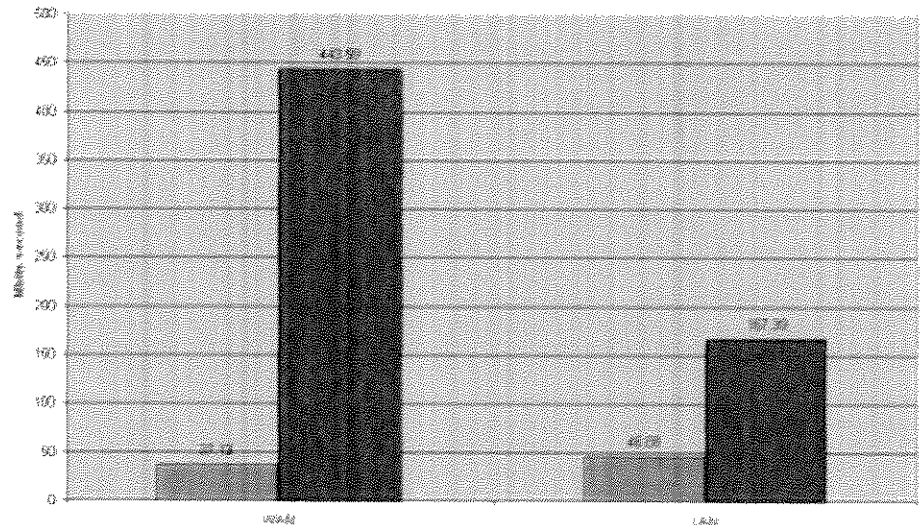


Figure 1: WAN/LAN Traffic Improvement Before and After ACO

VMware/Outlook Performance

Figure 2 shows the improvements to Microsoft Outlook's responsiveness running on VMware made possible by Veloxum's ACO process. Exchange response times decrease from an original 8 seconds to 1 second, an 800% improvement.

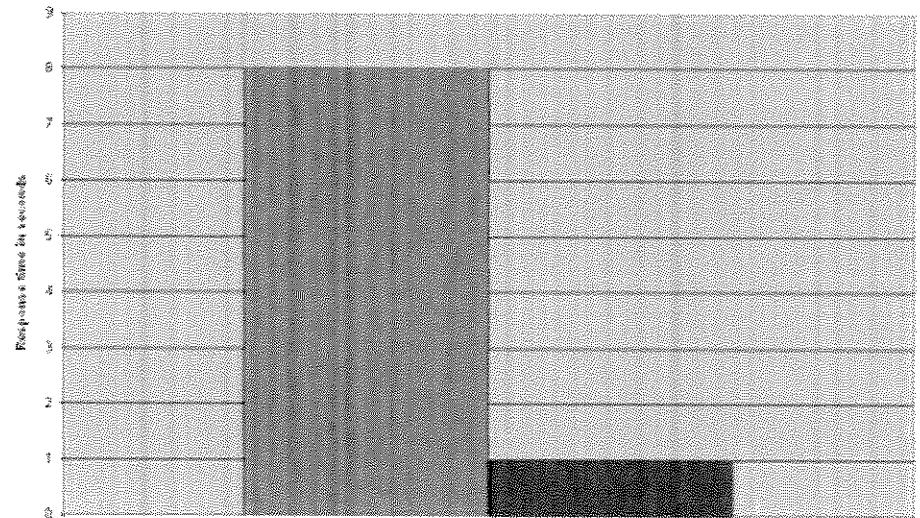


Figure 2: Improved VMware / Outlook Exchange Responsiveness

SQLserver Response

Figure 3 shows the improvements to Microsoft SQLserver responsiveness made possible by Veloxum's ACO process. Server response times decrease from an original 90 seconds to 53 seconds, a 60% improvement.

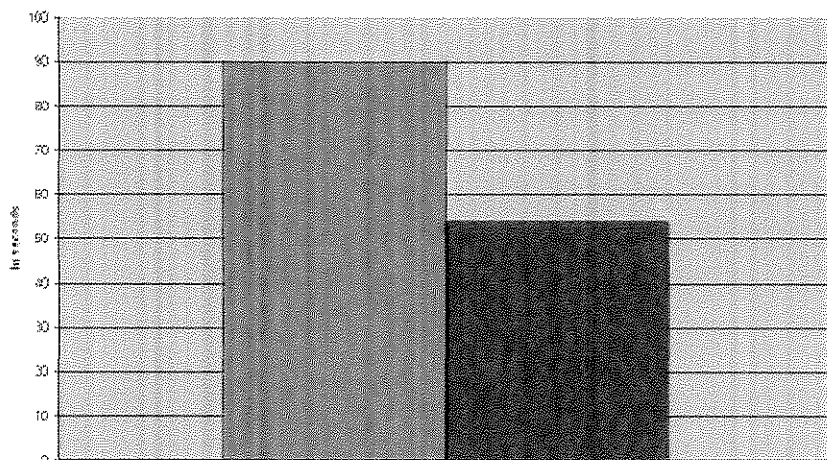


Figure 3: Improved SQLserver Responsiveness

iSCSI Throughput Improvement

Figure 4 shows the improvements to iSCSI throughput made possible by Veloxum's ACO process. Network throughput increases from an original 2475 I/O/s to 3525 I/O/s, a 42% improvement.

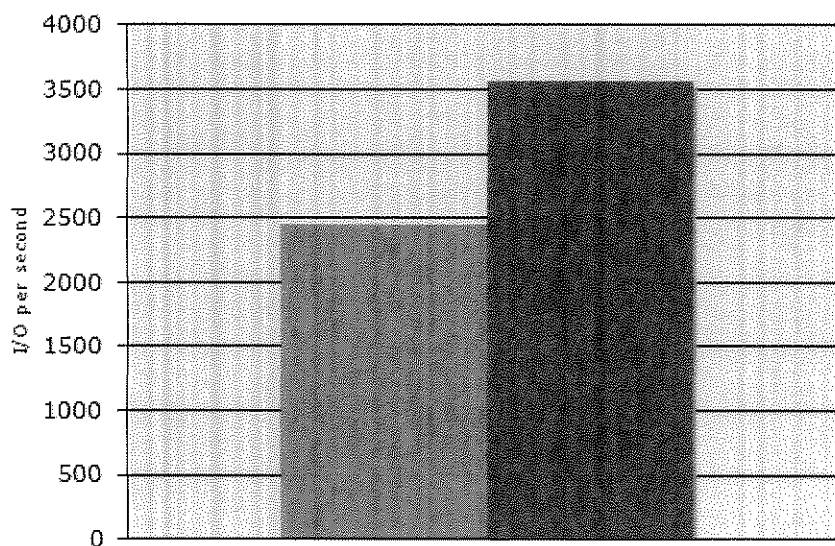


Figure 4: iSCSI Throughput Improvement

Conclusion

Veloxum designed its software's ACO process to maximize the efficiency of your existing infrastructure and to combat performance degradation whether caused by poor OS settings or the side effect of IT priorities. It delivers immediate ROI and lets you do more with your existing systems.

To learn more about Veloxum and Active Continuous Optimization of servers and clients visit <http://www.veloxum.com>.

¹ "How to Prioritize IT Spending During an Economic Recession" CIO Magazine, November 20, 2008; <<http://www.cio.com/article/464725>>

² "Optimizing Application Delivery over the WAN" Aberdeen Group, August 2008

Appendix A: ACO under the Covers – Multi-variable Optimization

Do you remember the first time you ever used an automatic camcorder? When you pushed the 'on' button, it seemingly came to life, with the lens twisting-and-turning out of the front. When aimed at your subjects, it knew to focus itself on them. If you happened to move into another room or outside, it automatically adjusted the light level to compensate for its new surroundings. Regardless of what you did, it would correct for it and optimize the image. Do you remember your thoughts at the time? Most likely it was, "Cool! This is like magic!" Well, welcome to the world of Active Continuous Optimization (ACO), where machines anticipate your needs and adapt to environmental changes.

To understand ACO operation theory, think about the automatic camcorder's operation. While modern camcorders operate, using highly-advanced algorithms beyond the scope of this paper, for the sake of explanation, this paper presents a greatly simplified operational scenario, focusing on only two functions and their associated camcorder settings – focal-length and light level.

When a videographer points a camcorder at a subject, the camcorder moves the lens back and forth in order to maximize the camcorder's relative focus in regard to the subject. The graph of the relative focus vs. the focal-length setting might look like the graph shown in Figure 1 below. The optimal focal-length range is around the peak of the relative focus value. If the focal-length is to the left of the optimum range, the subject is too blurry because the camcorder focuses too close for the subject. If to the right of the optimal range, the subject again becomes too blurred as the focus is too far away.

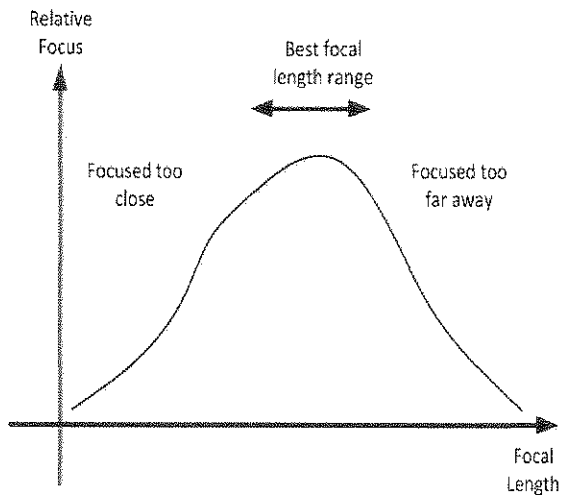


Figure 1: Camcorder Focus vs. Focal Length

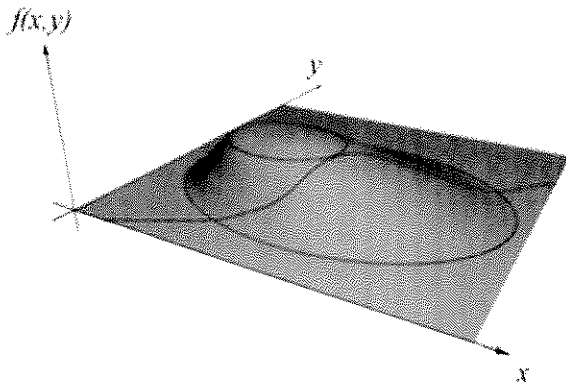


Figure 2: Focal-length optimized for light level

Perhaps it is obvious that the simple focus example above assumes a particular light level. If you constrain focal-length over all light levels settings - as camera manufacturers must - the graph becomes a three-dimensional contour as shown in Figure 2. In this diagram, the purple contour shows all possible focal-length settings for all possible light level settings. The red line represents a particular range of light levels overlaid onto this contour.

Solving for the optimum, focal-length setting for a particular light level then becomes a mathematical exercise in determining where the set of focal lengths (the upper contour ring) is tangential to the maximum (optimum) brightness for a given light level. In Figure 2 this occurs near the center of the diagram. When the camera figures out this value, it can zoom the lens in or out to the optimum setting for both variables.

Once you understand the general concept of optimizing one variable constrained by another, it may not come as a surprise that the technique also works just as well for multiple variables. However, for the purposes of this paper, it is important to know only that optimizing variables constrained by others follows generally accepted mathematical principles, and is used throughout everyday activities.

A Department of Energy study demonstrated that 90% of deployed servers nationwide operate at only 17% of capacity.

In other words, virtually every company or agency throughout the nation is losing hundreds of thousands (or millions) of dollars every year in wasted IT costs, simply because its infrastructure is not optimized. Even worse, this waste limits growth and damages the entity's competitive edge by directing funds for systems innovation and improvement toward unnecessary and expensive IT expenditures instead.

Veloxum recovers IT performance and related cost waste by deploying the industry's only automated systems optimizer that both improves company-wide IT efficiency and pays for itself.

The Complex Challenge

Today's IT Executives struggle to reduce infrastructure costs, improve the agility of IT, mitigate risk and increase network performance. Complicating their mission is the fact that IT networks are constantly growing in complexity and changing daily. As a result, IT professionals often have little time or ability to optimize an IT environment and maximize their current infrastructure investments. For the most part, these professionals spend the majority of their time simply implementing changes, purchasing new equipment to handle increased loads, and responding to problems that are many times a result of poor systems performance and mis-configuration.

Because of the constant change, complexity, and distraction, IT professionals rarely optimize performance - a result that costs the enterprise millions in wasted capacity.

The Simple Solution

Simply put, Veloxum resolves the IT optimization challenge by automatically tuning and optimizing each component of the IT environment. This one-of-a-kind performance solution known as **ACO** (Active Continuous Optimization) guarantees performance improvements of at least 30% and as great as 70%, while significantly reducing infrastructure costs and delivering an immediate return on investment. It's the only performance solution that more than pays for itself.

ACO Benefits

Veloxum's **ACO** Solution solves the most critical business challenges facing today's IT professionals by providing the following benefits:

- Increased utilization of existing systems, by up to 70%
- Increased LAN throughput (up to 800%), WAN throughput (up to 1300%), and guest throughput (up to 800%)
- Immediate operating budget reductions (eliminates many hardware and software purchase requirements)
- Easy to install and maintain (up and running (and yielding results) within approximately one hour)
- Reduced energy costs (**ACO** is "Green" and energy-efficient significantly reducing the carbon footprint)
- Fewer business interruptions and improved IT services and application performance
- Increased staff productivity
- Risk mitigation via minimized data bottlenecks, disconnects and replication windows

Veloxum is the only solution that automatically unlocks your client's unused capacity in existing servers, associated networks, applications and user devices realizing huge savings instantly.

Call 770-629-5020 or visit <http://veloxum.bluechannelmarketing.com>

How does ACO Do It?

Applicable to virtually every type of IT application and infrastructure component, including CRM, BI, Sales Force Atomization, Network Attached Storage, Virtual Desktop Infrastructures, all Microsoft systems, and Backup and Replication applications, **ACO** improves systems capacity and overall IT performance in the following principal ways:

- Examines the actual, foundational infrastructure and all associated systems, to include servers and storage
- Reviews the operating systems configuration within the existing environment
- Examines how the existing applications operate within the environment
- Reviews how the existing infrastructure, to include the host, servers, and workstations, communicate
- Collects and analyzes the above data and recommends optimum configurations for each element
- Automatically performs the optimum configuration
- Continuously monitors systems conditions and recommend updated configuration options, as needed

Clients Utilizing ACO

To date, Veloxum has delivered the **ACO** solution to numerous regional, national, and international clients, saving these firms millions of dollars by improving system efficiency 30-70% instantly. Some of these organizations include:

Deutsche Bank
U.S. Department of Energy
Westinghouse
United Nations Population Fund
ISI Emerging Markets
Baron Funds
Maimonides Health System
The Washington Post

Is ACO Right For You?

1. Would you be interested in a solution that could maximize your IT environment, recover 30-70% of unused its capacity, and minimize the need for you to buy hardware or software for the next few years?
2. Would you like to improve your Application Virtualization Performance by at least 30%, instantly and automatically?
3. If we could improve your IT systems performance by 30-70%, with a solution that pays for itself in just a few months, would you be interested in a quick demo?

Download Your Free Trial Today

Schedule a quick call with Blue Channel representative to take advantage of our free, no obligation, and full-featured 15-day **ACO** trial, allowing you to see, first-hand, what **ACO** can do for your infrastructure. And best of all, because it works quickly, **ACO** will demonstrate your specific results within one-hour of the free trial download.

Still not sure? For a brief demonstration on how **ACO** solves the infrastructure optimization problem, check out the following six-minute presentation:

<http://www.youtube.com/watch?v=KKxwnUbdo88>